**Supporting information**

**S1 Table. Extended baseline characteristics depending on time of admission** Data are n (%) or mean. COPD = chronic obstructive pulmonary disease, ICU = intensive care unit

**S2 Table.** Sensitivity analysis for the primary and secondary outcomes comparing the total study period (2006 to 2016), the years 2006 to 2013 and the years 2014 to 2016

**S3 Table. Association of time of admission with primary and secondary outcomes in different regions of Switzerland** Adjustment was made for age, sex, Charlson Comorbidity Index (CCI), year, and month of admission. TOA = time of admission, OR = odds ratio, 95% CI = 95% confidence interval, ref = reference, ICU = intensive care unit

**S4 Table. Adjusted absolute risk for primary and secondary outcomes by region of Switzerland** Data are % (95% CI) except for p value column. Positive ARD indicate an increased risk for the named endpoint in this region (R1) compared to all other regions except for this one (R0). Negative ARD indicate a lower risk in this region. AAR = adjusted absolute risk, ARD = adjusted risk difference, ref = reference, ICU = intensive care unit

**S5 Table. Adjusted absolute risk by region of Switzerland and time of admission** Data are % (95% CI) except for p value column. Positive ARD indicate an increased risk for the named endpoint in this region (R1) compared to all other regions except for this one (R0). Negative ARD indicate a lower risk in this region. AAR = adjusted absolute risk, ARD = adjusted risk difference, ref = reference, ICU = intensive care unit

**S1 Fig. Incidences of sepsis and endpoints over time** Primary and secondary outcome stratified by year. Information on intubation rates between 2006-2008 is lacking. 95% Confidence intervals for point estimates of each year are provided. ICU = intensive care unit

**S2 Fig. Interregional differences** Primary and secondary outcomes stratified by time of admission and regions of Switzerland. 95% Confidence intervals for point estimates of endpoint per region and time of admission are provided. ICU = intensive care unit

**S3 Fig. Odds ratio (S2 Table**) Primary and secondary outcomes stratified by time of admission and regions of Switzerland: A) Night shift admission, B) Weekend admission compared to routine-hours;

(I) In-hospital mortality (II) Intensive care unit admission (III) Intubation (IV) 30-day readmission. 95% CI = 95% confidence interval, ICU = intensive care unit

**S1 Table. Extended baseline characteristics depending on time of admission**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Characteristics** | **Entire cohort** | **Routine-hours** | **Night** | **Weekend** |
|  | 86’597 (100.0) | 52’052 (60.1) | 19’996 (23.1) | 14’549 (16.8) |
| **Age** |  |  |  |  |
| ≤60 years | 17’149 (19.8) | 10’130 (19.5) | 4’216 (21.1) | 2’803 (19.3) |
| >60 to <80 years | 40’359 (46.6) | 24’278 (46.6) | 9’393 (47.0) | 6’688 (46.0) |
| ≥80 years | 29’089 (33.6) | 17’644 (33.9) | 6’387 (31.9) | 5’058 (34.8) |
| **Gender** |  |  |  |  |
| Male | 48’579 (56.1) | 28’786 (55.3) | 11’616 (58.1) | 8’177 (56.2) |
| Female | 38’018 (43.9) | 23’266 (44.7) | 8’380 (41.9) | 6’’372 (43.8) |
| **Region** |  |  |  |  |
| "Ostschweiz" | 8’694 (10.0) | 5’480 (10.5) | 1’782 (8.9) | 1’432 (9.8) |
| "Zuerich" | 14’132 (16.3) | 7’819 (15.0) | 3’992 (20.0) | 2’321 (16.0) |
| “Zentralschweiz" | 6’806 (7.9) | 4’032 (7.7) | 1’582 (7.9) | 1’192 (8.2) |
| "Nordwestschweiz" | 14’005 (16.2) | 8’447 (16.2) | 3’240 (16.2) | 2’318 (15.9) |
| "Espace Mittelland" | 22’654 (26.2) | 13’638 (26.2) | 5’100 (25.5) | 3’916 (26.9) |
| "Genferseeregion" | 15’610 (18.0) | 9’760 (18.8) | 3’293 (16.5) | 2’557 (17.6) |
| "Tessin" | 4’696 (5.4) | 2’876 (5.5) | 1’007 (5.0) | 813 (5.6) |
| **Charlson Comorbidity Index (CCI)** | | | | |
| Group 1, 0 points | 31’430 (36.3) | 18’536 (35.6) | 7’543 (37.7) | 5’351 (36.8) |
| Group 2, 1-2 points | 31’979 (36.9) | 19’427 (37.3) | 7’226 (36.1) | 5’326 (36.6) |
| Group 3, 3-4 points | 15’473(17.9) | 9’384 (18.0) | 3’548 (17.7) | 2’541 (17.5) |
| Group 4, 5 points | 1’641 (1.9) | 979 (1.9) | 354 (1.8) | 308 (2.1) |
| Group 5, ≥6 points | 6’074 (7.0) | 3’726 (7.2) | 1’325 (6.6) | 1’023 (7.0) |
| CCI, mean value | 1.87 (2.25) | 1.89 (2.26) | 1.81 (2.22) | 1.87 (2.27) |
| **Comorbidities** | | | | |
| Cancer | 12’739 (14.7) | 7’808 (15.0) | 2’807 (14.0) | 2’124 (14.6) |
| Diabetes mellitus | 18’800 (21.7) | 11’387 (21.9) | 4’345 (21.7) | 3’068 (21.1) |
| Cerebrovascular disease | 3’627 (4.2) | 2’145 (4.1) | 854 (4.3) | 628 (4.3) |
| Coronary heart disease | 14’332 (16.6) | 8’434 (16.2) | 3’475 (17.4) | 2’423 (16.7) |
| Congestive heart failure | 12’566 (14.5) | 7’511 (14.4) | 2’941 (14.7) | 2’114 (14.5) |
| Arterial hypertension | 36’536 (42.2) | 21’999 (42.3) | 8’412 (42.1) | 6’125 (42.1) |
| COPD | 9’150 (10.6) | 5’532 (10.6) | 2’178 (10.9) | 1’440 (9.9) |
| Liver disease | 7’666 (8.9) | 4’734 (9.1) | 1’729 (8.6) | 1’203 (8.3) |
| Renal insufficiency | 28’896 (33.4) | 17’679 (34.0) | 6’365 (31.8) | 4’852 (33.3) |
| **Year** |  |  |  |  |
| 2006 | 2824 (3.3) | 1742 (3.4) | 643 (3.2) | 439 (3) |
| 2007 | 3115 (3.6) | 1858 (3.6) | 719 (3.6) | 538 (3.7) |
| 2008 | 3800 (4.4) | 2301 (4.4) | 885 (4.4) | 614 (4.2) |
| 2009 | 6907 (8) | 4072 (7.8) | 1705 (8.5) | 1130 (7.8) |
| 2010 | 9044 (10.4) | 5426 (10.4) | 2064 (10.3) | 1554 (10.7) |
| 2011 | 10120 (11.7) | 6017 (11.6) | 2409 (12.1) | 1694 (11.6) |
| 2012 | 11955 (13.8) | 7112 (13.7) | 2799 (14) | 2044 (14.1) |
| 2013 | 14379 (16.6) | 8582 (16.5) | 3363 (16.8) | 2434 (16.7) |
| 2014 | 7901 (9.1) | 4857 (9.3) | 1744 (8.7) | 1300 (8.9) |
| 2015 | 8535 (9.9) | 5196 (10) | 1893 (9.5) | 1446 (9.9) |
| 2016 | 8017 (9.3) | 4889 (9.4) | 1772 (8.9) | 1356 (9.3) |
| Data are n (%) or mean. COPD = chronic obstructive pulmonary disease, CCI = Charlson Comorbidity Index | | | | |

**S2 Table. Sensitivity analysis for the primary and secondary outcomes comparing the total study period (2006 to 2016), the years 2006 to 2013 and the years 2014 to 2016**

|  |  |  |
| --- | --- | --- |
|  | | |
|  | **Multivariable regression** | |
|  | OR (95% CI) | p-value |
| **In-hospital mortality** |  |  |
| Routine-hours | ref | ref |
| Night |  |  |
| all years | 0.93 (0.89,0.97) | .001 |
| 2006 to 2013 | 0.91 (0.86,0.95) | < .001 |
| 2014 to 2016 | 1.00 (0.93, 1.08) | .941 |
| Weekend |  |  |
| all years | 1.05 (1.01,1.10) | .029 |
| 2006 to 2013 | 1.03 (0.97,1.09) | .291 |
| 2014 to 2016 | 1.12 (1.03, 1.22) | .006 |
| **ICU admission** |  |  |
| Routine-hours | ref | ref |
| Night |  |  |
| all years | 1.27 (1.23,1.32) | < .001 |
| 2006 to 2013 | 1.24 (1.18,1.29) | < .001 |
| 2014 to 2016 | 1.42 (1.33,1.51) | < .001 |
| Weekend |  |  |
| all years | 1.14 (1.10,1.19) | < .001 |
| 2006 to 2013 | 1.11 (1.05,1.17) | < .001 |
| 2014 to 2016 | 1.24 (1.16, 1.34) | < .001 |
| **Intubation** |  |  |
| Routine-hours | ref | ref |
| Night |  |  |
| all years | 1.30 (1.24,1.36) | < .001 |
| 2006 to 2013 | 1.27 (1.19,1.35) | < .001 |
| 2014 to 2016 | 1.36 (1.26,1.46) | < .001 |
| Weekend |  |  |
| all years | 1.18 (1.12,1.25) | < .001 |
| 2006 to 2013 | 1.18 (1.10, 1.27) | < .001 |
| 2014 to 2016 | 1.19 (1.10,1.30) | < .001 |
| **30-day readmission** |  |  |
| Routine-hours | ref | ref |
| Night |  |  |
| all years | 0.99 (0.94,1.04) | .622 |
| 2006 to 2013 | 0.98 (0.92, 1.05) | .604 |
| 2014 to 2016 | 0.99 (0.89,1.10) | .849 |
| Weekend |  |  |
| all years | 0.96 (0.90,1.02) | .178 |
| 2006 to 2013 | 0.95 (0.89, 1.02) | .163 |
| 2014 to 2016 | 0.98 (0.87,1.10) | .723 |
| Adjustment was made for age, sex, Charlson Comorbidity Index (CCI), year, month, and region of admission. OR = odds ratio, 95% CI = 95% confidence interval, ref = reference, ICU = intensive care unit | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S3 Table. Association of time of admission with primary and secondary outcomes in different regions of Switzerland** | | | | | |
|  | **No. Events by TOA,** n (%) | **Univariate regression** | | **Multivariable regression** | |
|  | OR (95% CI) | p-value | OR (95% CI) | p-value |
| **"Ostschweiz"** |  |  |  |  |  |
| **In-hospital mortality** | 1’668 (19.2) | - | - | - | - |
| Routine-hours | 1’057 (19.3) | ref | ref | ref | ref |
| Night | 309 (17.3) | 00.88 (0.76,1.01) | .068 | 0.89 (0.77,1.03) | .105 |
| Weekend | 302 (21.1) | 1.12 (0.97,1.29) | .127 | 1.11 (0.96,1.28) | .175 |
| **ICU admission** | 2’087 (24.0) | - | - | - | - |
| Routine-hours | 1’237 (22.6) | ref | ref | ref | ref |
| Night | 480 (26.9) | 1.26 (1.12,1.43) | < .001 | 1.27 (1.12,1.44) | < .001 |
| Weekend | 370 (25.8) | 1.20 (1.04,1.37) | .009 | 1.19 (1.04,1.37) | .012 |
| **Intubation** | 1’101 (12.7) | - | - | - | - |
| Routine-hours | 670 (12.2) | ref | ref | ref | ref |
| Night | 246 (13.8) | 1.15 (0.98,1.35) | .081 | 1.17 (1.00,1.38) | .052 |
| Weekend | 185 (12.9) | 1.07 (0.89,1.27) | .478 | 1.06 (0.89,1.27) | .523 |
| **30-day readmission** | 928 (10.7) | - | - | - | - |
| Routine-hours | 602 (11.0) | ref | ref | ref | ref |
| Night | 179 (10.0) | 0.90 (0.76,1.08) | .266 | 0.89 (0.74,1.06) | .186 |
| Weekend | 147 (10.3) | 0.93 (0.77,1.12) | .435 | 0.92 (0.76,1.12) | .414 |
| **"Zuerich"** |  |  |  |  |  |
| **In-hospital mortality** | 2’740 (19.4) | - | - | - | - |
| Routine-hours | 1’565 (20.0) | ref | ref | ref | ref |
| Night | 746 (18.7) | 0.92 (0.83,1.01) | .085 | 0.91 (0.82,1.01) | .066 |
| Weekend | 429 (18.5) | 0.91 (0.80,1.02) | .103 | 0.90 (0.80,1.01) | .085 |
| **ICU admission** | 4’512 (31.9) | - | - | - | - |
| Routine-hours | 2’480 (31.7) | ref | ref | ref | ref |
| Night | 1’271 (31.8) | 1.01 (0.93,1.09) | .894 | 1.05 (0.97,1.14) | .259 |
| Weekend | 761 (32.8) | 1.05 (0.95,1.16) | .332 | 1.06 (0.95,1.17) | .291 |
| **Intubation** | 2’325 (16.5) | - | - | - | - |
| Routine-hours | 1’270 (16.2) | ref | ref | ref | ref |
| Night | 639 (16.0) | 0.98 (0.89,1.09) | .742 | 1.06 (0.95,1.18) | .296 |
| Weekend | 416 (17.9) | 1.13 (1.00,1.27) | .056 | 1.14 (1.01,1.30) | .035 |
| **30-day readmission** | 1’544 (10.9) | - | - | - | - |
| Routine-hours | 830 (10.6) | ref | ref | ref | ref |
| Night | 458 (11.5) | 1.09 (0.97,1.23) | .157 | 1.09 (0.96,1.23) | .187 |
| Weekend | 256 (11.0) | 1.04 (0.90,1.21) | .571 | 1.05 (0.90,1.21) | .557 |
| **"Zentralschweiz"** |  |  |  |  |  |
| **In-hospital mortality** | 1’215 (17.9) | - | - | - | - |
| Routine-hours | 724 (18.0) | ref | ref | ref | ref |
| Night | 258 (16.3) | 0.89 (0.76,1.04) | .144 | 0.92 (0.78,1.08) | .307 |
| Weekend | 233 (19.6) | 1.11 (0.94,1.31) | .212 | 1.08 (0.92,1.28) | .347 |
| **ICU admission** | 2’281 (33.5) | - | - | - | - |
| Routine-hours | 1’311 (32.5) | ref | ref | ref | ref |
| Night | 574 (36.3) | 1.18 (1.05,1.34) | .007 | 1.17 (1.03,1.33) | .013 |
| Weekend | 396 (33.2) | 1.03 (0.90,1.18) | .648 | 1.05 (0.91,1.21) | .474 |
| **Intubation** | 764 (11.2) | - | - | - | - |
| Routine-hours | 435 (10.8) | ref | ref | ref | ref |
| Night | 190 (12.0) | 1.13 (0.94,1.35) | .191 | 1.12 (0.93,1.35) | .224 |
| Weekend | 139 (11.7) | 1.09 (0.89,1.34) | .398 | 1.12 (0.91,1.38) | .301 |
| **30-day readmission** | 665 (9.8) | - | - | - | - |
| Routine-hours | 383 (9.5) | ref | ref | ref | ref |
| Night | 174 (11.0) | 1.17 (0.97,1.42) | .091 | 1.17 (0.97,1.42) | .099 |
| Weekend | 108 (9.1) | 0.95 (0.76,1.19) | .648 | 0.96 (0.77,1.20) | .712 |
| **"Nordwestschweiz"** |  |  |  |  |  |
| **In-hospital mortality** | 2’440 (17.4) | - | - | - | - |
| Routine-hours | 1’441 (17.1) | ref | ref | ref | ref |
| Night | 579 (17.9) | 1.06 (0.95,1.18) | .299 | 1.06 (0.95,1.18) | .284 |
| Weekend | 420 (18.1) | 1.08 (0.95,1.21) | .232 | 1.09 (0.96,1.23) | .187 |
| **ICU admission** | 3’691 (26.4) | - | - | - | - |
| Routine-hours | 2’073 (24.5) | ref | ref | ref | ref |
| Night | 963 (29.7) | 1.30 (1.19,1.42) | < .001 | 1.30 (1.19,1.43) | < .001 |
| Weekend | 655 (28.3) | 1.21 (1.09,1.34) | < .001 | 1.23 (1.10,1.37) | < .001 |
| **Intubation** | 1’899 (13.6) | - | - | - | - |
| Routine-hours | 1’036 (12.3) | ref | ref | ref | ref |
| Night | 511 (15.77) | 1.34 (1.19,1.50) | < .001 | 1.37 (1.21,1.54) | < .001 |
| Weekend | 352 (15.2) | 1.28 (1.12,1.46) | < .001 | 1.33 (1.16,1.53) | < .001 |
| **30-day readmission** | 1’533 (11.0) | - | - | - | - |
| Routine-hours | 967 (11.5) | ref | ref | ref | ref |
| Night | 342 (10.6) | 0.91 (.80,1.04) | .171 | 0.91 (0.79,1.03) | .138 |
| Weekend | 224 (9.7) | 0.83 (0.71,0.96) | .015 | 0.83 (0.71,0.96) | .015 |
| **"Espace Mitteland"** |  |  |  |  |  |
| **In-hospital mortality** | 4’019 (17.7) | - | - | - | - |
| Routine-hours | 2’463 (18.1) | ref | ref | ref | ref |
| Night | 815 (16.0) | 0.86 (0.79,0.94) | .001 | 0.89 (0.81,0.97) | .009 |
| Weekend | 741 (18.9) | 1.06 (0.97,1.16) | .218 | 1.06 (0.96,1.16) | .251 |
| **ICU admission** | 5’799 (25.6) | - | - | - | - |
| Routine-hours | 3’300 (24.2) | ref | ref | ref | ref |
| Night | 1’513 (29.7) | 1.32 (1.23,1.42) | < .001 | 1.31 (1.22,1.41) | < .001 |
| Weekend | 986 (25.2) | 1.05 (0.97,1.14) | .208 | 1.07 (0.98,1.16) | .127 |
| **Intubation** | 2’811 (12.4) | - | - | - | - |
| Routine-hours | 1’559 (11.4) | ref | ref | ref | ref |
| Night | 750 (14.7) | 1.34 (1.22,1.47) | < .001 | 1.32 (1.20,1.46) | <.001 |
| Weekend | 502 (12.8) | 1.14 (1.02,1.27) | .017 | 1.16 (1.04,1.29) | .010 |
| **30-day readmission** | 2’327 (10.3) | - | - | - | - |
| Routine-hours | 1’391 (10.2) | ref | ref | ref | ref |
| Night | 532 (10.4) | 1.03 (0.92,1.14) | .641 | 1.03 (0.93,1.15) | .574 |
| Weekend | 404 (10.3) | 1.01 (0.90,1.14) | .831 | 1.02 (0.91,1.14) | .764 |
| **"Genferseeregion"** |  |  |  |  |  |
| **In-hospital mortality** | 3’162 (20.3) | - | - | - | - |
| Routine-hours | 2’008 (20.6) | ref | ref | ref | ref |
| Night | 604 (18.3) | 0.87 (0.78,0.96) | .006 | 0.90 (0.81,1.00) | .053 |
| Weekend | 550 (21.5) | 1.06 (0.95,1.18) | .299 | 1.06 (0.96,1.19) | .256 |
| **ICU admission** | 5’568 (35.7) | - | - | - | - |
| Routine-hours | 3’213 (32.9) | ref | ref | ref | ref |
| Night | 1’370 (41.6) | 1.45 (1.34,1.57) | < .001 | 1.41 (1.30,1.53) | < .001 |
| Weekend | 985 (38.5) | 1.28 (1.17,1.40) | < .001 | 1.28 (1.17,1.41) | < .001 |
| **Intubation** | 2’450 (15.7) | - | - | - | - |
| Routine-hours | 1’369 (14.0) | ref | ref | ref | ref |
| Night | 660 (20.0) | 1.54 (1.39,1.70) | < .001 | 1.51 (1.36,1.68) | < .001 |
| Weekend | 421 (16.5) | 1.21 (1.07,1.36) | .002 | 1.21 (1.07,1.37) | .002 |
| **30-day readmission** | 1’348 (8.6) | - | - | - | - |
| Routine-hours | 869 (8.9) | ref | ref | ref | ref |
| Night | 261 (7.9) | 0.88 (0.76,1.02) | .085 | 0.87 (0.75,1.00) | .051 |
| Weekend | 218 (8.5) | 0.95 (0.82,1.11) | .549 | 0.95 (0.82,1.11) | .543 |
| **"Tessin"** |  |  |  |  |  |
| **In-hospital mortality** | 1’204 (60.4) | - | - | - | - |
| Routine-hours | 727 (59.2) | ref | ref | ref | ref |
| Night | 238 (62.8) | 0.91 (0.77,1.08) | .299 | 0.98 (0.82,1.17) | .818 |
| Weekend | 239 (61.9) | 1.23 (1.04,1.46) | .018 | 1.24 (1.04,1.48) | .019 |
| **ICU admission** | 1’679 (12.9) | - | - | - | - |
| Routine-hours | 954 (13.4) | ref | ref | ref | ref |
| Night | 435 (12.1) | 1.53 (1.32,1.77) | < .001 | 1.53 (1.32,1.78) | < .001 |
| Weekend | 290 (12.2) | 1.12 (.95,1.32) | .183 | 1.16 (0.98,1.37) | .086 |
| **Intubation** | 645 (35.8) | - | - | - | - |
| Routine-hours | 352 (33.2) | ref | ref | ref | ref |
| Night | 176 (43.2) | 1.52 (1.25,1.85) | < .001 | 1.67 (1.35,2.07) | < .001 |
| Weekend | 117 (35.7) | 1.21 (0.96,1.51) | .104 | 1.24 (0.98,1.58) | .078 |
| **30-day readmission** | 605 (25.6) | - | - | - | - |
| Routine-hours | 384 (25.3) | ref | ref | ref | ref |
| Night | 122 (23.6) | 0.89 (0.72,1.11) | .316 | 0.91 (0.73,1.13) | .388 |
| Weekend | 99 (29.4) | 0.90 (0.71,1.14) | .381 | 0.94 (0.74,1.19) | .589 |
| Adjustment was made for age, sex, Charlson Comorbidity Index (CCI), year, and month of admission. TOA = time of admission, OR = odds ratio, 95% CI = 95% confidence interval, ref = reference, ICU = intensive care unit | | | | | |
|  | | | | | |

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| --- | --- | --- | --- | --- | --- |
| **S4 Table. Adjusted absolute risk for primary and secondary outcomes by region of Switzerland** | | | | | |
|  | **Adjusted absolute risk (AAR) of named region = R1** | **Adjusted absolute risk (AAR) of all regions except R1** **= R0** | **Absolute risk difference (ARD) ARD = R1 - R0** | **p-value** |
| **In-hospital mortality** |  |  |  |  |
| "Ostschweiz" | 20.89 (19.83,21.94) | 18.80  (18.52,19.07) | 2.09 (0.97,3.21) | < .001 |
| "Zuerich" | 20.60 (19.83,21.38) | 18.70 (18.41,18.98) | 1.91  (1.05,2.76) | < .001 |
| "Zentralschweiz" | 18.35 (17.42,19.27) | 19.05  (18.78,19.31) | -0.70 (-1.67,0.26) | .154 |
| "Nordwestschweiz" | 17.44  (16.82,18.06) | 19.29  (19.01,19.57) | -1.85  (-2.53,-1.18) | < .001 |
| "Espace Mittelland" | 17.36  (16.87,17.85) | 19.59  (19.28,19.89) | -2.22 (-2.82,-1.63) | < .001 |
| "Genferseeregion" | 19.90  (19.21,20.59) | 18.79  (18.50,19.08) | 1.11 (0.33,1.89) | .006 |
| "Tessin" | 24.89  (23.57,26.21) | 18.65  (18.38,18.91) | 6.24 (4.88,7.60) | < .001 |
| **ICU admission** |  |  |  |  |
| "Ostschweiz" | 25.83 (24.73,26.93) | 29.98 (29.66,30.30) | -4.15 (-5.34,-2.97) | < .001 |
| "Zuerich" | 35.32 (34.40,36.24) | 28.53  (28.20,28.86) | 6.79  (5.77,7.81) | < .001 |
| "Zentralschweiz" | 34.90 (33.76,36.04) | 29.14  (28.83,29.45) | 5.76 (4.58,6.94) | < .001 |
| "Nordwestschweiz" | 26.70  (25.98,27.42) | 30.13  (29.81,30.46) | -3.43 (-4.23,-2.64) | < .001 |
| "Espace Mittelland" | 24.17  (23.62,24.72) | 31.59  (31.23,31.95) | -7.42 (-8.09,-6.75 | < .001 |
| "Genferseeregion" | 35.15 (34.31,36.00) | 28.35  (28.01,28.68) | 6.80 (5.86,7.75) | < .001 |
| "Tessin" | 35.45  (33.98,36.91) | 29.24  (28.94,29.55) | 6.21 (4.70,7.71) | < .001 |
| **Intubation** |  |  |  |  |
| "Ostschweiz" | 12.30 (11.50,13.09) | 14.03 (13.79,14.27) | -1.73 (-2.59,-0.87) | < .001 |
| "Zuerich" | 17.32  (16.60,18.05) | 13.20 (12.96,13.45) | 4.12 (3.32,4.92) | < .001 |
| "Zentralschweiz" | 11.35  (10.60,12.10) | 14.06  (13.83,14.30) | -2.71 (-3.50,-1.93) | < .001 |
| "Nordwestschweiz" | 14.11  (13.54,14.68) | 13.80  (13.56,14.05) | 0.31 (-0.31,0.93) | .330 |
| "Espace Mittelland" | 11.91  (11.50,12.33) | 14.57  (14.30,14.84) | -2.66 (-3.16,-2.15) | < .001 |
| "Genferseeregion" | 15.91  (15.26,16.56) | 13.41  (13.16,13.66) | 2.50 (1.77,3.23) | < .001 |
| "Tessin" | 15.60  (14.45,16.75) | 13.76 (13.53,13.99) | 1.84 (0.66,3.02) | .002 |
| **30-day readmission** |  |  |  |  |
| "Ostschweiz" | 10.24  (09.49,11.00) | 10.35 (10.13,10.57) | -0.10 (-0.92,0.71) | .806 |
| "Zuerich" | 10.63 (10.06,11.21) | 10.28 (10.05,10.50) | 0.36 (-0.29,1.00) | .277 |
| "Zentralschweiz" | 9.65  (8.95,10.36) | 10.39  (10.18,10.61) | -0.74 (-1.48,-0.00) | .049 |
| "Nordwestschweiz" | 10.88  (10.37,11.39) | 10.23  (10.01,10.45) | 0.65 (0.09,1.21) | .022 |
| "Espace Mittelland" | 10.46  (10.04,10.88) | 10.29  (10.05,10.53) | 0.17 (-0.32,0.66) | .493 |
| "Genferseeregion" | 8.45  (7.97,8.92) | 10.76  (10.53,11.00) | -2.31 (-2.87,-1.76) | < .001 |
| "Tessin" | 14.19  (13.04,15.34) | 10.13  (9.93,10.34) | 4.05  (2.88,5.23) | < .001 |
| Data are % (95% CI) except for p value column. Positive ARD indicate an increased risk for the named endpoint in this region (R1) compared to all other regions except for this one (R0). Negative ARD indicate a lower risk in this region. AAR = adjusted absolute risk, ARD = adjusted risk difference, ref = reference, ICU = intensive care unit | | | | |
|  | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S5 Table. Adjusted absolute risk by region of Switzerland and time of admission** | | | | |
|  | **Adjusted absolute risk [AAR] of named region = R1** | **Adjusted absolute risk [AAR] of all regions except R1** **= R0** | **Absolute risk difference [ARD]** **ARD = R1 - R0** | **p-value** | |
|  |  |  |  |  | |
| **In-hospital mortality** |  |  |  |  | |
| "Ostschweiz" | 20.77 (19.43,22.11) | 19.01 (18.65,19.36) | 1.76 (0.33,3.19) | .016 | |
| Night | 18.09 (16.02,20.17) | 17.72 (17.16,18.27) | 0.38 (-1.82,2.58) | .736 | |
| Weekend | 24.75 (21.91,27.58) | 19.58 (18.90,20.25) | 5.17 (2.17,8.16) | .001 | |
| "Zuerich" | 21.39 (20.34,22.43) | 18.82 (18.45,19.18) | 2.57 (1.43,3.72) | < .001 | |
| Night | 19.46 (18.00,20.92) | 17.34 (16.74,17.94) | 2.12 (0.45,3.79) | .013 | |
| Weekend | 19.90 (18.02,21.78) | 20.05 (19.34,20.76) | -0.15 (-2.24,1.93) | .884 | |
| "Zentralschweiz" | 18.41 (17.21,19.61) | 19.25 (18.90,19.59) | -0.84 (-2.09,0.42) | .191 | |
| Night | 16.82 (14.97,18.67) | 17.83 (17.29,18.37) | -1.01 (-2.94,0.93) | .308 | |
| Weekend | 20.11 (17.82,22.41) | 20.02 (19.36,20.69) | 0.09 (-2.30,2.49) | .939 | |
| "Nordwestschweiz" | 17.11 (16.32,17.90) | 19.58 (19.22,19.95) | -2.47 (-3.34,-1.60) | < .001 | |
| Night | 17.59 (16.31,18.87) | 17.78 (17.21,18.35) | -0.19 (-1.59,1.21) | .790 | |
| Weekend | 18.41 (16.85,19.97) | 20.33 (19.63,21.03) | -1.92 (-3.63,-0.21) | .028 | |
| "Espace Mittelland" | 17.74 (17.10,18.39) | 19.70 (19.31,20.10) | -1.96 (-2.72,-1.19) | < .001 | |
| Night | 15.70 (14.69,16.71) | 18.46 (17.84,19.08) | -2.77 (-3.98,-1.56) | < .001 | |
| Weekend | 18.22 (17.01,19.42) | 20.72 (19.96,21.49) | -2.51 (-3.96,-1.06) | .001 | |
| "Genferseeregion" | 20.30 (19.41,21.18) | 18.92 (18.54,19.30) | 1.38 (0.38,2.38) | .007 | |
| Night | 18.32 (16.84,19.79) | 17.64 (17.05,18.22) | 0.68 (-0.96,2.33) | .416 | |
| Weekend | 20.53 (18.83,22.23) | 19.92 (19.19,20.64) | 0.62 (-1.30,2.54) | .529 | |
| "Tessin" | 24.47 (22.80,26.14) | 18.87 (18.52,19.21) | 5.60 (3.89,7.32) | < .001 | |
| Night | 23.90 (21.04,26.75) | 17.42 (16.89,17.96) | 6.47 (3.55,9.40) | < .001 | |
| Weekend | 27.85 (24.55,31.14) | 19.55 (18.89,20.20) | 8.30 (4.91,11.69) | < .001 | |
| **ICU admission** |  |  |  |  | |
| "Ostschweiz" | 23.26 (21.92,24.60) | 28.53 (28.12,28.95) | -5.27 (-6.72,-3.82) | < .001 | |
| Night | 31.67 (29.09,34.24) | 33.16 (32.48,33.84) | -1.49 (-4.21,1.23) | .283 | |
| Weekend | 27.98 (25.18,30.77) | 30.80 (30.01,31.59) | -2.83 (-5.82,0.16) | .064 | |
| "Zuerich" | 34.57 (33.34,35.79) | 26.89 (26.47,27.30) | 7.68 (6.35,9.02) | < .001 | |
| Night | 37.11 (35.30,38.93) | 32.11 (31.38,32.84) | 5.00 (2.94,7.06) | < .001 | |
| Weekend | 35.86 (33.59,38.13) | 29.58 (28.77,30.39) | 6.28 (3.78,8.78) | < .001 | |
| "Zentralschweiz" | 33.66 (32.20,35.13) | 27.52 (27.13,27.91) | 6.14 (4.62,7.67) | < .001 | |
| Night | 38.09 (35.69,40.48) | 32.61 (31.95,33.27) | 5.48 (2.99,7.97) | < .001 | |
| Weekend | 35.18 (32.44,37.91) | 30.14 (29.37,30.90) | 5.04 (2.20,7.88) | .001 | |
| "Nordwestschweiz" | 24.86 (23.95,25.77) | 28.59 (28.17,29.00) | -3.73 (-4.73,-2.72) | < .001 | |
| Night | 30.01 (28.46,31.56) | 33.62 (32.92,34.32) | -3.61 (-5.31,-1.91) | < .001 | |
| Weekend | 28.54 (26.73,30.35) | 30.92 (30.11,31.72) | -2.38 (-4.36,-0.40) | .019 | |
| "Espace Mittelland" | 23.10 (22.40,23.80) | 29.79 (29.34,30.25) | -6.69 (-7.54,-5.84) | < .001 | |
| Night | 27.20 (26.00,28.40) | 35.18 (34.41,35.94) | -7.97 (-9.43,-6.52) | < .001 | |
| Weekend | 23.74 (22.43,25.06) | 33.16 (32.27,34.05) | -9.42 (-11.04,-7.81) | < .001 | |
| "Genferseeregion" | 32.89 (31.84,33.95) | 26.86 (26.43,27.29) | 6.04 (4.85,7.23) | < .001 | |
| Night | 38.94 (37.08,40.81) | 31.83 (31.11,32.55) | 7.11 (5.04,9.19) | < .001 | |
| Weekend | 38.44 (36.32,40.56) | 28.86 (28.04,29.67) | 9.58 (7.22,11.95) | < .001 | |
| "Tessin" | 33.22 (31.37,35.06) | 27.68 (27.29,28.07) | 5.54 (3.63,7.44) | < .001 | |
| Night | 41.47 (38.22,44.73) | 32.58 (31.92,33.24) | 8.89 (5.54,12.24) | < .001 | |
| Weekend | 35.63 (32.10,39.16) | 30.24 (29.48,30.99) | 5.39 (1.75,9.03) | .004 | |
| **Intubation** |  |  |  |  | |
| "Ostschweiz" | 11.23 (10.28,12.18) | 13.06 (12.75,13.37) | -1.83 (-2.87,-.79) | .001 | |
| Night | 15.55 (13.55,17.55) | 15.89 (15.37,16.41) | -0.34 (-2.45,1.77) | .753 | |
| Weekend | 12.00 (10.12,13.88) | 14.96 (14.35,15.57) | -2.96 (-5.01,-0.92) | .005 | |
| "Zuerich" | 16.36 (15.42,17.29) | 12.24 (11.93,12.54) | 4.12 (3.10,5.14) | < .001 | |
| Night | 18.93 (17.41,20.46) | 15.21 (14.66,15.76) | 3.72 (2.02,5.43) | < .001 | |
| Weekend | 18.72 (16.88,20.56) | 13.91 (13.30,14.52) | 4.81 (2.80,6.83) | < .001 | |
| "Zentralschweiz" | 10.77 (9.83,11.71) | 13.03 (12.74,13.32) | -2.26 (-3.25,-1.27) | < .001 | |
| Night | 12.47 (10.84,14.10) | 16.15 (15.63,16.66) | -3.68 (-5.39,-1.97) | < .001 | |
| Weekend | 11.99 (10.15,13.83) | 14.89 (14.30,15.47) | -2.89 (-4.83,-0.96) | .003 | |
| "Nordwestschweiz" | 12.76 (12.05,13.46) | 12.87 (12.57,13.18) | -0.11 (-0.88,0.65) | .771 | |
| Night | 16.28 (15.04,17.53) | 15.78 (15.25,16.32) | 0.50 (-0.86,1.86) | .471 | |
| Weekend | 15.88 (14.41,17.34) | 14.43 (13.83,15.03) | 1.45 (-0.14,3.03) | .074 | |
| "Espace Mittelland" | 11.20 (10.67,11.72) | 13.46 (13.12,13.80) | -2.26 (-2.90,-1.62) | < .001 | |
| Night | 13.42 (12.52,14.33) | 16.79 (16.19,17.38) | -3.36 (-4.47,-2.26) | < .001 | |
| Weekend | 12.35 (11.34,13.37) | 15.54 (14.86,16.22) | -3.18 (-4.43,-1.94) | < .001 | |
| "Genferseeregion" | 14.69 (13.88,15.50) | 12.45 (12.14,12.77) | 2.23 (1.33,3.14) | < .001 | |
| Night | 18.66 (17.20,20.13) | 15.28 (14.73,15.83) | 3.39 (1.76,5.02) | < .001 | |
| Weekend | 16.63 (15.01,18.25) | 14.24 (13.61,14.86) | 2.39 (0.59,4.20) | .009 | |
| "Tessin" | 14.39 (12.95,15.83) | 12.78 (12.49,13.06) | 1.62 (0.13,3.10) | .033 | |
| Night | 18.33 (15.76,20.90) | 15.74 (15.23,16.24) | 2.59 (-0.05,5.23) | .054 | |
| Weekend | 16.37 (13.55,19.19) | 14.56 (13.99,15.14) | 1.80 (-1.10,4.70) | .223 | |
| **30-day readmission** |  |  |  |  | |
| "Ostschweiz" | 10.96 (9.94,11.98) | 10.36 (10.08,10.65) | 0.60 (-0.50,1.69) | .288 | |
| Night | 8.85 (7.42,10.28) | 10.51 (10.05,10.96) | -1.66 (-3.20,-0.12) | .035 | |
| Weekend | 9.83 (8.01,11.66) | 10.03 (9.50,10.55) | -0.19 (-2.16,1.77) | .846 | |
| "Zuerich" | 10.30 (9.54,11.05) | 10.45 (10.16,10.74) | -0.15 (-0.99,0.68) | .720 | |
| Night | 11.08 (9.94,12.21) | 10.15 (9.66,10.64) | 0.93 (-0.38,2.23) | .164 | |
| Weekend | 10.96 (9.49,12.42) | 9.83 (9.28,10.37) | 1.13 (-0.49,2.76) | .171 | |
| "Zentralschweiz" | 9.40 (8.50,10.31) | 10.51 (10.24,10.79) | -1.11 (-2.06,-0.16) | .022 | |
| Night | 10.72 (9.20,12.24) | 10.31 (9.87,10.75) | 0.41 (-1.18,2.00) | .612 | |
| Weekend | 9.03 (7.39,10.68) | 10.09 (9.58,10.61) | -1.06 (-2.79,0.66) | .228 | |
| "Nordwestschweiz" | 11.39 (10.71,12.06) | 10.24 (9.95,10.52) | 1.15 (0.42,1.88) | .002 | |
| Night | 10.51 (9.45,11.56) | 10.31 (9.85,10.77) | 0.20 (-0.95,1.34) | .739 | |
| Weekend | 9.61 (8.41,10.80) | 10.08 (9.55,10.62) | -0.47 (-1.78,0.83) | .478 | |
| "Espace Mittelland" | 10.31 (9.78,10.84) | 10.46 (10.16,10.77) | -0.15 (-0.78,0.47) | .629 | |
| Night | 10.87 (9.95,11.79) | 10.17 (9.68,10.66) | 0.70 (-0.37,1.76) | .201 | |
| Weekend | 10.52 (9.51,11.53) | 9.82 (9.25,10.40) | 0.69 (-0.49,1.88) | .253 | |
| "Genferseeregion" | 8.68 (8.07,9.30) | 10.84 (10.53,11.14) | -2.15 (-2.87,-1.44) | < .001 | |
| Night | 7.84 (6.83,8.85) | 10.84 (10.36,11.32) | -3.00 (-4.16,-1.83) | < .001 | |
| Weekend | 8.33 (7.16,9.51) | 10.37 (9.81,10.94) | -2.04 (-3.39,-0.69) | .003 | |
| "Tessin" | 14.41 (12.94,15.87) | 10.21 (9.94,10.48) | 4.20 (2.70,5.70) | < .001 | |
| Night | 14.11 (11.58,16.64) | 10.17 (9.74,10.60) | 3.94 (1.36,6.53) | .003 | |
| Weekend | 13.41 (10.71,16.11) | 9.82 (9.33,10.32) | 3.58 (0.82,6.35) | .011 | |
| Data are % (95% CI) except for p value column. The first row of each region indicates the values of the routine-hours for the named endpoint. Positive ARD indicate an increased risk for the named endpoint in this region (R1) compared to all other regions except for this one (R0). Negative ARD indicate a lower risk in this region. AAR = adjusted absolute risk, ARD = adjusted risk difference, ref = reference, ICU = intensive care unit | | | | |

**S1 Fig. Incidence of sepsis and endpoints over time**



**S2 Fig. Interregional differences**

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**S3 Fig. Odds ratio (S2 Table) of primary and secondary outcomes stratified by time of admission and regions of Switzerland:  
A) Night shift admission, B) Weekend admission compared to routine-hours**



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(I) In-hospital mortality (II) Intensive care unit admission (III) Intubation (IV) 30-day readmission. 95% CI = 95% confidence interval, ICU = intensive care unit